Claims

1.   Apparatus for predicting the speech level in an utterance of a speaker exposed to an environment containing a variable level of ambient acoustic noise, the apparatus
5   comprising means for measuring said ambient acoustic noise level, and processing means for using said measured acoustic noise level to predict the likely speech level in said utterance.

2.   Apparatus according to Claim 1, wherein said measuring
10   means measures the ambient acoustic noise level immediately adjacent to said utterance.

3.   Apparatus according to Claim 2, including means for activating said measuring means before the utterance.

4.   Apparatus according to an preceding Claim which
15   includes means operable to define, for each utterance, an utterance period comprising a first time period for measuring said acoustic noise level and a second time period during which said utterance is made.

5.   Apparatus according to Claim 4, which includes a user
20   input device, a timer, control means for defining said first period, and said second period, and means for indicating to a user the end of said first period.

6.   Apparatus according to Claim 5, wherein said apparatus is responsive to a succession of one or more utterances by
25   a speaker, and said measuring means is operable to measure the ambient noise level prevailing at each of said utterances to provide a series of noise values, and said

apparatus includes means for measuring the speech level of an utterance, and said processing means uses at least two of said noise values, together with a value representative of the speech level of the immediately previous utterance, to

5 predict the likely speech level of the next utterance.

7. Apparatus according to Claim 6, wherein said measuring means is adapted to measure the ambient acoustic noise level before an utterance, and the processing means estimates the speech level S_1^* of an utterance (1) on the basis of the

10 following expression:

$$S_1^* = S_o + f(N_o - N_1)$$

where

S_o is the speech level of the immediately previous utterance;

15 N_1, N_o are the noise levels prevailing immediately before the utterance whose speech level is to be estimated, and immediately before the next previous utterance respectively, and

f(x) is a function relating changes in the noise level

20 in which the speaker is situated to the speaker's speech level.

8. Apparatus according to Claim 7, wherein said processing means predicts the speech level S_1^* on the basis of the following expression:

25 $$S_1^* = S_o + k(N_o - N_1)$$

where k is a constant, k>1.

9. Apparatus according to Claim 8, wherein k lies in the range of from 0 to 0.6.

10. A speech recognition apparatus for use in an environment containing ambient acoustic noise, said apparatus including speech recogniser means for receiving and processing data representative of a speech utterance to

5 be recognised to output data representative of or dependent on the lexical content of said utterance, said apparatus including level adjusting means for adjusting the level of the speech utterance, said apparatus further including means for measuring said ambient acoustic noise level before or

10 during said utterance, processing means for using said measured acoustic noise level to predict the likely level of the speech utterance, and means for adjusting said level controlling means in accordance with said prediction of the likely level of the speech utterance.

15 11. A method for predicting the speech level of an utterance of a speaker exposed to an environment containing a variable level of ambient acoustic noise, said method comprising the steps of:-

measuring said ambient acoustic noise level, and

20 processing said measured acoustic noise level to predict the likely speech level of said utterance.

12 A method according to Claim 11, wherein said ambient acoustic noise level is measured before said utterance.

13. A method according to Claim 11, wherein a plurality of

25 measurements of said acoustic noise level is taken and used with one or measurements of the speech levels corresponding to said measurements of acoustic noise level to predict the likely speech level of the utterance.

14. A method for controlling the gain in a speech recognition or processing system in an environment containing a variable level of ambient acoustic noise, which method comprises controlling the gain of the speech signal in accordance with an estimate of the speech level, said estimate being obtained by measuring said ambient acoustic noise level, and processing said measured acoustic noise level to produce an estimate of the likely speech level of said utterance.